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REC'D 30 MAR 2000

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Signed

*Andrew Gersey*

Dated

13 March 2000



Patents Form 1/77

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**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

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1.	Your reference	DRC/JMD/5481UK		
2.	Patent application number (The Patent Office will fill in this part)	24 MAR 1999		9906650.8
3.	Full name, address and postcode of the or of each applicant (underline all surnames)	MCGILL, Shane Robert McGill Technology Building Endeavour Park London Road Addington West Malling ME19 5TN  Patents ADP number (if you know it)  If the applicant is a corporate body, give the country/state of its incorporation		
		United Kingdom		
4.	Title of the invention	FOOD DISPENSING APPARATUS		
5.	Name of your agent (if you have one)	Lewis & Taylor		
	"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)	5 The Quadrant Coventry CV1 2EL		
	Patents ADP number (if you know it)	711001		
6.	If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of filing (day / month / year)
7.	If this application is divided or otherwise derived from an earlier UK application, give the number and filing date of the earlier application	Number of earlier application	Date of filing (day / month / year)	
8.	Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'yes' if: a) any applicant named in part 3 is not an inventor, or b) there is an inventor who is not named as an applicant, or c) any named applicant is a corporate body. See note (d))	NO		

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description	8
Claim(s)	-
Abstract	-
Drawing(s)	2

10. If you are also filing any of the following, state how many against each item.

Priority documents	-
Translation of priority documents	-
Statement of inventorship and right to grant of a patent ( <i>Patents Form 7/77</i> )	-
Request for preliminary examination and search ( <i>Patents Form 9/77</i> )	-
Request for substantive examination ( <i>Patents Form 10/77</i> )	-
Any other documents ( <i>please specify</i> )	-

11.

I/We request the grant of a patent on the basis of this application.

Signature

*Lewis & Taylor*

Date

23 March 1999

12. Name and daytime telephone number of person to contact in the United Kingdom

David R Cowan  
Lewis & Taylor  
01203 222756

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## FOOD DISPENSING APPARATUS

This invention relates to food dispensing apparatus, for example, apparatus for blending and dispensing food from a container. The invention has particular application to milkshakes but can be used with other food products, particularly those which need to be heated.

5 In earlier patent specifications PCT/GB98/03193, GB 9025475.8 and GB 9904347.3 there are described food blending apparatus and a method of blending food within a container. Aspects of the method and apparatus described are common to the present application which seeks to provide an improved, modified apparatus by which the product is to be prepared for consumption.

10 According to the invention there is provided food dispensing apparatus for dispensing food product from a container in which the food is at a low temperature below a dispensing temperature, which apparatus comprises a compartment for the food container, operating means for acting on the food in the container, heating means for heating the product in the container whilst the container is in the compartment before operation of said operating  
15 means, and loading and unloading means for locating the container in and out of the compartment.

Preferably the heating means includes microwave radiation heating means arranged to direct such radiation at the food within the container.

Preferably the operating means comprises blending means for blending the food product in  
20 the container after operation of the heating means to bring the product temperature up to a suitable predetermined temperature for operation of said blending means.

The blending means may be arranged to blend the food product whilst it remains in said compartment after the heating operation. The blending means may include a drive motor releasably, drivingly engageable with a blending element located in the container.

The apparatus may include a mounting for the container movably arranged to be locatable in said compartment for heating and blending, said movement being a movement of the container in and out of the compartment for location and removal of the container from the mounting.

- 5 Preferably the mounting includes a horizontally movable platform drivably movable between a position outside the compartment and a position in said compartment.

- A temperature sensor may be provided to detect the temperature of the food product at entry into the compartment and, optionally, during the heating of the food in the container. This enables the heating phase to be timed to ensure that the desired amount of heat is given to the food product according to the predetermined desired temperature of the product for the blending operation and having regard to the initial temperature of the food product.
- 10

The mounting may include an upstanding mounting member which is located in a corresponding opening in the container extending upwards from the base of the container.

- The mounting may also include a seating arranged to extend around the container and support the external surfaces of the container.
- 15

The heating means may include microwave radiation means directed to the container and its contents in a defined region of the compartment in which they are located.

Alternatively the heating means may comprise a heated mounting for the container.

- Generally the apparatus will comprise a housing in which is defined said compartment and the compartment defines a shield for the microwave heating.
- 20

According to another aspect the invention provides a method of dispensing food in which a container of cold product is heated up to a predetermined temperature within food dispensing apparatus by microwave heating means, the warmed food product is subjected to a blending

operation whereby the food product is blended, and the container with blended food product is removed from the compartment for consumption.

Conveniently the food is cold product stored at low temperatures in which the product is frozen, and is located in the compartment for subsequent heating and blending operations.

- 5 Before the food product is heated the temperature of the product is detected and the heating operation is performed for a duration dependent on the initial food temperature.

Further features of the invention will appear from the following description of an embodiment of the invention given by way of example only and with reference to the drawings, in which:

- 10 Fig. 1 is a vertical section through a food container assembly,

Fig. 2 is a vertical section through apparatus for heating and blending the food in the container of Fig. 1, in one position, and

Fig 3. is a view corresponding to Fig. 2 in another position.

- 15 Referring to the drawings there is shown a container assembly 1 for use in blending apparatus which container comprises a body portion 3 consisting of a plastics vessel in the shape of a beaker having a base 3A, upwardly diverging, circular cross-section side walls 3B and an upper edge 3C of the container. The container is nestable with other containers, when empty, by location of the base through the upper opening of another container.

- 20 In its base 3A the container is formed with a peripheral downwardly projecting portion 3D and centrally of the base 3A is formed a hollow, upwardly-extending location member 3E. The member 3E is closed at its upper end and is of truncated cone shape having an opening 3F at its lower end accessible from the outside of the container. The opening 3F has a rectangular shape for location of the container on a support, to be described, but may be of any other suitable shape. An annular recess 3G extends around the member 3E and opens

into the internal volume of the container. The member 3E may not be hollow, in some applications and may be formed of foamed plastics.

5 The container body or vessel 3 is provided with a closure member 2 constituting a lid arranged to fit over the upper end of the body 3 over the upper edge 3C and to close the opening at the top of the body after filling with product. The lid 2 is generally circular having an outer portion 2A which fits over the upper edge 3C of the body to be sealingly engaged over the opening. This may be by a clip arrangement, by heat sealing, or by any other suitable means for securing the lid 2 on the body 3.

10 At the centre of the lid 2 is formed an opening 5 through which drive means, to be described, extends during a blending operation. After the container has been filled and during transport prior to a blending operation the opening is sealed with a removable seal 5A usually adhesively attached to the lid 2 and having a tab 5B by which it is peeled off. A bung 5C may be located in the opening 5 after the sealing member 5A has been removed and after a blending operation.

15 The assembly also includes a blending element 7 which is arranged for location in the container over the location member 3E and for rotation relative to the container and location member. The blending element 7 comprises a hollow, circular section body 8 open at its lower end 9 and being of generally frusto-conical shape arranged to fit over the correspondingly shaped location member 3E. Impeller blades 12 are located in pairs axially  
20 spaced along the element 7 and extend outwardly from the central axis in the radial direction. The blades 12 in each pair extend from opposite sides of the element 7 and are angled to the horizontal to impart a blending action on the contents of the container. The blending element 7 is provided with longitudinal slots 11 at opposite sides extending part way along the length of the element from its lower end, which slots 11 are to accommodate the blades 12 when the  
25 element 7 is nested with other elements.

At the upper end of the element 7 there is provided an opening 13 the inner sides of which are shaped to receive, in driving engagement therewith, drive means (Figs 2 and 3) for



driving the blending element 7 during a blending operation.

In other respects the container assembly may be as described in application GB 9904347.3.

Referring now particularly to Figs 2 and 3 there is shown apparatus by which the food product within the container is heated and blended prior to consumption. It will be appreciated that the container 3 is charged with food product with the lid or closure 2 not present, and with the blending element 7 in position in the container so that the food product substantially fills or partially fills the container body. The lid 2 is then located on the container 3 to seal product within the container.

For the purposes of the present invention the filled container is then frozen to a storage temperature at which the food product will be preserved for substantial periods. Such temperature may be of the order of  $-20^{\circ}\text{C}$  and is a temperature at which the food product cannot be readily blended. In order to bring the food product to a blending temperature prior to a blending operation the food product may be tempered in a tempering cabinet. to a blending temperature which may be of the order of  $-4^{\circ}$ . In the present case however the apparatus of Figs 2 and 3 is intended to enable the food product to reach a blending temperature quickly and without the use of a tempering cabinet.

The heating and blending apparatus of Figs 2 and 3 includes a main housing 50 defining within it a compartment 51 in which the heating and blending operation takes place. A holder 52 is provided in which the container 1 is locatable, the holder 52 defining an interior space and the container seats in the space with its side walls in contact with the walls of the holder. If required the holder 52 includes a central upwardly directed portion shaped to locate into the hollow location member 3E to secure the container.

The holder 52 is movable in a horizontal direction between the positions shown in Fig 2, from which the container can be loaded into and out of the holder 52, and an operating position shown in Fig 3 in which the holder 52 and container 1 are within the compartment 51. Movement between these positions is achieved by drive means 53 which is conveniently

a piston and cylinder arrangement of which a cylinder 54 is fixed within the housing 50 and a piston rod 55 extends out of the piston 54 for movement relative to the cylinder.

The compartment 51 defines a region in which microwave radiation can be directed to the food product within the container 1 whereby to heat the food product from the low, frozen  
5 temperature to a higher, blending temperature. The microwave radiation is arranged to heat up the food product by known means but using focused radiation whereby it is the volume occupied by the food product which receives the radiation in a directed way. The holder 52 is preferably provided with temperature detection means (not shown) whereby when the container is placed in the holder 52 the temperature of the food product is detected. This may  
10 be by temperature detecting means located outside of the compartment 51 or by temperature detection means within the compartment, for example infra-red temperature detection means. The temperature detected may vary and hence the duration of heating may need to be varied according to the temperature of product in the container compared with the temperature to which the product is to be brought for a blending operation. The duration of heating is  
15 calculated so that the heating means operates for the predetermined time which may be of the order of 5-10 seconds, depending also on the power of the microwave heating means. Usually the blending temperature of the food product will be of the order of  $-3^{\circ}\text{C}$  to  $-4^{\circ}\text{C}$  compared with an initial temperature of about  $-20^{\circ}\text{C}$ .

It will be appreciated that the compartment 51, when closed, provides shield means for the  
20 microwave radiation and there is provided a door 56 which is lowered into position to close the compartment 51 when the holder 52 is located within the compartment.

Upon completion of the heating of the food within the container the product within the container may be blended. Blending is by operation of a drive motor 60 located above the compartment 51 and having a drive shaft 61 extending downwardly towards the  
25 compartment 51. To couple the drive shaft 61 to the blending element 7, the shaft 61 is moved downwardly into engagement into the opening 13 so as to be in driving engagement with the element 7. Movement of the shaft 61 relative to the motor 60 is achieved by providing a splined connection 63, the connection moving up and down on an output spline

of the blender motor shaft by means of a U-shaped arm 64 activated up and down by a linear drive 65.

After engagement of the shaft 61 with the blending element 7 and completion of a blending operation the shaft 61 is withdrawn upwards to resume its initial position. The door 56 is moved to an open position and the container with its associated holder 52 is ejected from the compartment 51 to the position shown in Fig 2. The container with its blended food product can now be lifted out of the holder 52 and is ready for consumption.

It will be appreciated that the components of the container and holder which enter the compartment 51 need to be manufactured from material which do not affect the microwave environment.

Usually the tab 5A will be removed from the container before it is introduced into the heating and blending position but, to avoid the need for removal of such tab, the closure for the opening may be arranged so that the drive shaft can break through the seal to enter the opening 13.

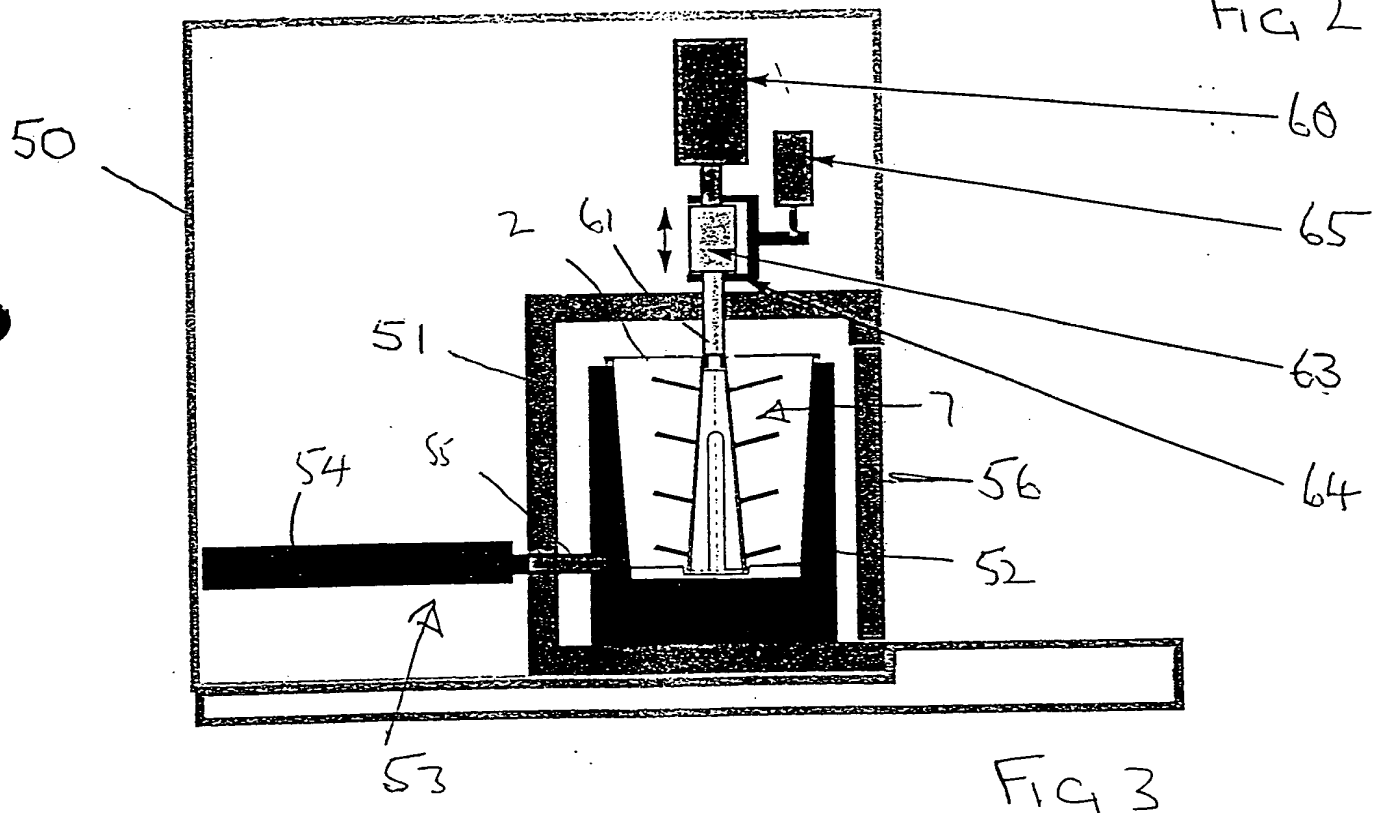
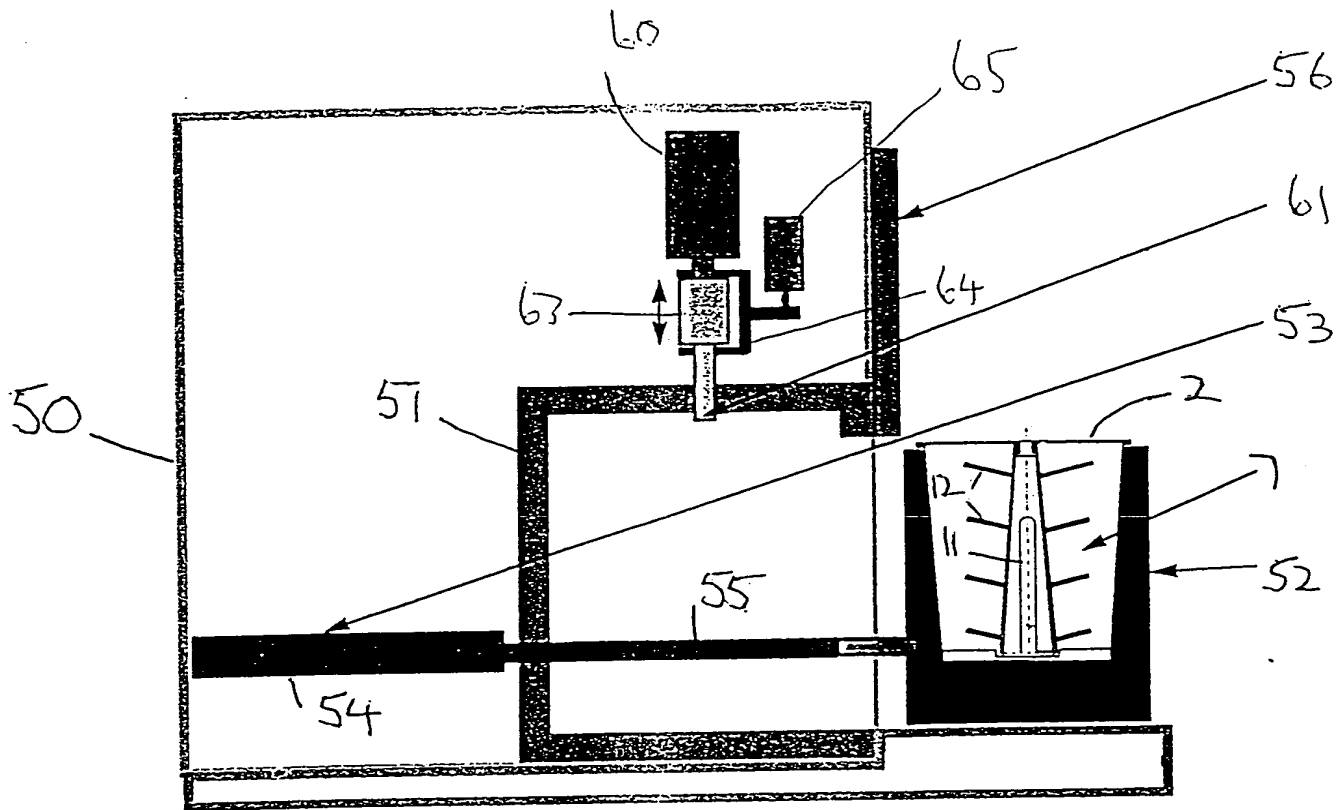
The holder 52 can be used to assist in directing the microwave energy inside the holder and the microwave transmission can be either from within the holder, outside the holder or from both inside and outside the holder 52.

The housing 50 can accommodate more than one compartment 51, for example 2-4 compartments. Alternatively a common compartment for multiple containers can be employed.

As a further alternative, instead of using microwave radiation for heating the food product within the container the holder 52 and any upwardly directed mandrel within the holder 52 can be made of heated metal, for example aluminium, thereby providing a heat sink by which the food product may be heated once it is placed in the holder 52. Although the heating may not be sufficient to raise the temperature of all the product within the container it may be

enough to enable the blending operation to be performed.

Flavour additives and aeration of the food product may be achieved by having means such as inlet tubes (not shown) to introduce such components into the container associated with the up and down movement of the shaft 61.



PC7/GB00/715

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Lewis + Taylor